

Unit 15

Day 1

Synthetic Division

Review: $(x^3 + 4x^2 - 2x - 12) \div (x + 3)$

$$\begin{array}{r|rrrr} -3 & 1 & 4 & -2 & -12 \\ & & -3 & -3 & 15 \\ \hline & 1 & 1 & -5 & 3 \end{array}$$

$$x^2 + x - 5 + \frac{3}{x+3}$$

Write answer in form $\text{quotient} + \frac{\text{remainder}}{\text{divisor}}$.

Ex1: Using synthetic division

$$(x^3 + 4x^2 - 2x - 12) \div (x + 3)$$

Synthetic division may only be used when dividing by a linear binomial in the form of $x - k$.

Ex2: Write your answer using the division Algorithm

$$(x^4 - 5x^2 - 10x + 12) \div (x - 2) =$$

$$\begin{array}{r|rrrrrr} 2 & 1 & 0 & -5 & -10 & 12 \\ & & 2 & 4 & -2 & -24 \\ \hline & 1 & 2 & -1 & -12 & -12 \end{array}$$

$$x^3 + 2x^2 - x - 12 \text{ R } \frac{-12}{x-2}$$

HW pg 290 5-18all

Unit 15

Day 2

The Remainder Theorem

Remainder Theorem: If the polynomial $P(x)$ is divided by $x-k$, the remainder is $P(k)$

1) $P(x) = x^3 + 8x^2 - 5x - 84$ $k = -5$

2)

$$f(x) = 2x^3 + 3x^2 - 8x - 12 \quad k = -2$$

When is the remainder theorem useful?

Is $P(x) = -2x^{19} + 8x^{17} - 6x^{10} + x^8 + 12$ divisible by $x-2$?

Is $P(x) = x^{26} - 6x^{18} + 3$ divisible by $x-i$?

Extra problems:

1) Is $P(x) = x^{99} - 2x^{52} + x^2$ divisible by $x+1$?

2) Is $P(x) = x^{101} + 3x^{20} + x^3$ divisible by $x-i$?

3) Find the value of k so that $(x^2 + 4x + 8) \div (x - k)$ has a remainder of 4.

HW pg 290-291 1-4 all, 20-30 even & Extra problems